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<110> YOSHIOKA, HIROFUMI

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<141> 2005-06-02

<150> JP 2002-351701

<151> 2002-12-03

<150> JP 2003-294409

<151> 2003-08-18

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<170> PatentIn Ver. 3.3

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<213> Solanum tuberosum

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<210> 6
 <211> 374
 <212> PRT
 <213> Solanum tuberosum

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Arg Pro Arg Arg Arg Thr Asp Leu Thr Leu Pro Leu Pro Gln Arg Asp
  35           40           45

Val Ala Leu Ala Val Pro Leu Pro Leu Pro Pro Thr Ser Ala Pro Ser
  50           55           60

Ser Ser Ser Ser Ser Ser Ser Ser Pro Leu Pro Thr Pro Leu His Phe
  65           70           75           80

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Ser Glu Leu Glu Arg Val Asn Arg Ile Gly Ser Gly Thr Gly Gly Thr
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 Val Tyr Lys Val Leu His Arg Pro Thr Gly Arg Leu Tyr Ala Leu Lys
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 Val Ile Tyr Gly Asn His Glu Asp Ser Val Arg Leu Gln Met Cys Arg
 115 120 125
 Glu Ile Glu Ile Leu Arg Asp Val Asp Asn Pro Asn Val Val Arg Cys
 130 135 140
 His Asp Met Phe Asp His Asn Gly Glu Ile Gln Val Leu Leu Glu Phe
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 Met Asp Lys Gly Ser Leu Glu Gly Ile His Ile Pro Leu Glu Gln Pro
 165 170 175
 Leu Ser Asp Leu Thr Arg Gln Val Leu Ser Gly Leu Tyr Tyr Leu His
 180 185 190
 Arg Arg Lys Ile Val His Arg Asp Ile Lys Pro Ser Asn Leu Leu Ile
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 Asn Ser Arg Arg Glu Val Lys Ile Ala Asp Phe Gly Val Ser Arg Val
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 Leu Ala Gln Thr Met Asp Pro Cys Asn Ser Ser Val Gly Thr Ile Ala
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 Tyr Met Ser Pro Glu Arg Ile Asn Thr Asp Leu Asn His Gly Gln Tyr
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 Asp Gly Tyr Ala Gly Asp Ile Trp Ser Leu Gly Val Ser Ile Leu Glu
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 Phe Tyr Leu Gly Arg Phe Pro Phe Ser Val Gly Arg Gln Gly Asp Trp
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 Ala Ser Leu Met Cys Ala Ile Cys Met Ser Gln Pro Pro Glu Ala Pro
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 Pro Thr Ala Ser Arg Glu Phe Arg Glu Phe Ile Ala Cys Cys Leu Gln
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 Arg Asp Pro Ala Arg Arg Trp Thr Ala Ala Gln Leu Leu Arg His Pro
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 Phe Ile Thr Gln Asn Ser Pro Gly Thr His Thr Gly Pro Ala Thr Thr
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 <212> DNA
 <213> Artificial Sequence

<220>
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<210> 8
 <211> 374
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
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 Arg Pro Arg Arg Arg Thr Asp Leu Thr Leu Pro Leu Pro Gln Arg Asp
 35 40 45
 Val Ala Leu Ala Val Pro Leu Pro Leu Pro Pro Thr Ser Ala Pro Ser
 50 55 60
 Ser Ser Ser Ser Ser Ser Ser Ser Pro Leu Pro Thr Pro Leu His Phe
 65 70 75 80
 Ser Glu Leu Glu Arg Val Asn Arg Ile Gly Ser Gly Thr Gly Gly Thr
 85 90 95

Val	Tyr	Lys	Val	Leu	His	Arg	Pro	Thr	Gly	Arg	Leu	Tyr	Ala	Leu	Lys	100	105	110
Val	Ile	Tyr	Gly	Asn	His	Glu	Asp	Ser	Val	Arg	Leu	Gln	Met	Cys	Arg	115	120	125
Glu	Ile	Glu	Ile	Leu	Arg	Asp	Val	Asp	Asn	Pro	Asn	Val	Val	Arg	Cys	130	135	140
His	Asp	Met	Phe	Asp	His	Asn	Gly	Glu	Ile	Gln	Val	Leu	Leu	Glu	Phe	145	150	155
Met	Asp	Lys	Gly	Ser	Leu	Glu	Gly	Ile	His	Ile	Pro	Leu	Glu	Gln	Pro	165	170	175
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Arg	Arg	Lys	Ile	Val	His	Arg	Asp	Ile	Lys	Pro	Ser	Asn	Leu	Leu	Ile	195	200	205
Asn	Ser	Arg	Arg	Glu	Val	Lys	Ile	Ala	Asp	Phe	Gly	Val	Ser	Arg	Val	210	215	220
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Ala	Ser	Leu	Met	Cys	Ala	Ile	Cys	Met	Ser	Gln	Pro	Pro	Glu	Ala	Pro	290	295	300
Pro	Thr	Ala	Ser	Arg	Glu	Phe	Arg	Glu	Phe	Ile	Ala	Cys	Cys	Leu	Gln	305	310	315
Arg	Asp	Pro	Ala	Arg	Arg	Trp	Thr	Ala	Ala	Gln	Leu	Leu	Arg	His	Pro	325	330	335
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<220>
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<220>
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<210> 11
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<220>
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 <223> Description of Artificial Sequence: Synthetic
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 <210> 16
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 <223> Description of Artificial Sequence: Synthetic
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<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

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<210> 20
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<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 20
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<210> 21
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 <213> Solanum tuberosum

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<210> 22

<211> 1337

<212> DNA

<213> Solanum tuberosum

<400> 22

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 <213> Solanum tuberosum

<400> 23
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<210> 24
 <211> 1288
 <212> DNA
 <213> Solanum tuberosum

<400> 24
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<210> 25
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 25
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<210> 26
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 26
cggaattcgt cgcaccttac tattcccatc 30

<210> 27
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 27
cggaattcctt tataatagtg cactcatgct 30

<210> 28
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 28
cggaattcgc tatatTTTTT caagttgaag 30

<210> 29
<211> 30
<212> DNA
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<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 29
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<210> 30
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primer

<400> 30
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<210> 31
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primer

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<210> 32
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<223> Description of Artificial Sequence: Synthetic
primer

<400> 32
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<210> 33
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primer

<400> 33
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<210> 34
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<223> Description of Artificial Sequence: Synthetic
primer

<400> 34
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<210> 35
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<220>
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<400> 35
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30

<210> 36
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<220>
 <223> Description of Artificial Sequence: Synthetic
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<400> 36
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28

<210> 37
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<220>
 <223> Description of Artificial Sequence: Synthetic
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<400> 37
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27

<210> 38
 <211> 26
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<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 38
 gtcgacgaca cagccacgta cgaggt

26

<210> 39
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 <212> DNA
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<220>
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 primer

<400> 39
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26

<210> 40
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 <212> DNA
 <213> Solanum tuberosum

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 40 45 50
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 Glu Lys Gln Ile Asp Asp Met Leu Asp Gln Ile Tyr Lys Ala Asp Pro
 90 95 100
 aac ttt gac gct cat gat tta aac act tta tcc ctt caa ttt cga ata 3088
 Asn Phe Asp Ala His Asp Leu Asn Thr Leu Ser Leu Gln Phe Arg Ile
 105 110 115

tta aga caa cat ggt tac aat atc tcc caa a gtaggtccat catttaaaac 3139
 Leu Arg Gln His Gly Tyr Asn Ile Ser Gln
 120 125

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gatcatgatac cag aa ttt ttc agc aga ttc caa gat gcg aat ggc aag ttc 3250
 Lys Phe Phe Ser Arg Phe Gln Asp Ala Asn Gly Lys Phe
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aag gaa tgt ctt agc aac gac atc agg ggt cta ttg aac tta tac gaa 3298
 Lys Glu Cys Leu Ser Asn Asp Ile Arg Gly Leu Leu Asn Leu Tyr Glu
 145 150 155

gct tca cat gta agg act cat gga gaa gat att tta gaa gag gca ctt 3346
 Ala Ser His Val Arg Thr His Gly Glu Asp Ile Leu Glu Glu Ala Leu
 160 165 170

gtt ttc tcc act gct cat ctt gag tct gca gct cca cat ttg gag tca 3394
 Val Phe Ser Thr Ala His Leu Glu Ser Ala Ala Pro His Leu Glu Ser
 175 180 185

cct ctg agt aag caa gtg act cat gcc ctt gag cag tct ctc cat aag 3442
 Pro Leu Ser Lys Gln Val Thr His Ala Leu Glu Gln Ser Leu His Lys
 190 195 200

agc att cca aga gtc gag acg cgc tac ttc atc tcc atc tac gaa gag 3490
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 205 210 215 220

gag gaa ttt aag aat gat gtg ttg ctt cga ttt gcc aaa ttg gat tac 3538
 Glu Glu Phe Lys Asn Asp Val Leu Leu Arg Phe Ala Lys Leu Asp Tyr
 225 230 235

aac tta ctc cag atg ttg cac aaa cac gaa ctt agt gaa gta tca ag 3585
 Asn Leu Leu Gln Met Leu His Lys His Glu Leu Ser Glu Val Ser Arg
 240 245 250

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ttctaagatt ggtacttatt ttgtag g tgg tgg aaa gat ttg gat ttt gtg 3696
 Trp Trp Lys Asp Leu Asp Phe Val
 255 260

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 Thr Thr Leu Pro Tyr Ala Arg Asp Arg Ala Val Glu Cys Tyr Phe Trp
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 295 300 305

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 310 315 320

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 Arg
 325

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 Trp Asp Ile Ser Gln Ile Asp Arg Leu
 330

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 Pro Glu Tyr Met Lys Val Ser Phe Lys Ala Leu Leu Asp Leu Tyr Glu
 335 340 345 350

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 Asp Tyr Glu Lys Glu Leu Ser Lys Asp Gly Arg Ser Asp Val Val His
 355 360 365

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 Tyr Ala Lys Glu Arg
 370

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 Met Lys Glu Ile Val Arg Asn Tyr Phe Val
 375 380

gaa gca aag tgg ttc att gag gga tat atg ccg cct gtt tct gag tat 4304
 Glu Ala Lys Trp Phe Ile Glu Gly Tyr Met Pro Pro Val Ser Glu Tyr
 385 390 395

ctt agc aat gca tta gct acc agc aca tat tac ttg cta act aca aca 4352
 Leu Ser Asn Ala Leu Ala Thr Ser Thr Tyr Tyr Leu Leu Thr Thr Thr
 400 405 410

tcc tat ttg gga gtg aag tca gca aca aag gaa gat ttt gaa tgg ttg 4400
 Ser Tyr Leu Gly Val Lys Ser Ala Thr Lys Glu Asp Phe Glu Trp Leu
 415 420 425

gct acg aac cct aaa att ctt gaa gcc aat gtg aca tta tgc cga gtt 4448
 Ala Thr Asn Pro Lys Ile Leu Glu Ala Asn Val Thr Leu Cys Arg Val
 430 435 440 445

gtt gat gac ata gca acg tat gag gtaattagca tcgcattaca ctacataaat 4502
 Val Asp Asp Ile Ala Thr Tyr Glu
 450

catcttataa tttagagtta cagtaattta atacaaattg atttcacata cttataaatg 4562

aattataatt gccattccag gtt gag aag ggt agg ggc caa atc gca aca gga 4615
 Val Glu Lys Gly Arg Gly Gln Ile Ala Thr Gly
 455 460

att gag tgt tat atg agg gat tat gac gta tca aca gaa gta gca atg 4663
 Ile Glu Cys Tyr Met Arg Asp Tyr Asp Val Ser Thr Glu Val Ala Met
 465 470 475 480

 gaa aaa ttc caa gag atg gct gag ata gca tgg aag gat gta aat gaa 4711
 Glu Lys Phe Gln Glu Met Ala Glu Ile Ala Trp Lys Asp Val Asn Glu
 485 490 495

 gga att ctt cga cca aca cct gtc tct aca gaa att ctt act cgc att 4759
 Gly Ile Leu Arg Pro Thr Pro Val Ser Thr Glu Ile Leu Thr Arg Ile
 500 505 510

 ctc aat ctt gct cgt att ata gat gtc act tac aag cac aat caa gat 4807
 Leu Asn Leu Ala Arg Ile Ile Asp Val Thr Tyr Lys His Asn Gln Asp
 515 520 525

 gga tac act cat ccc gaa aaa gtt cta aaa cct cac atc att gct tta 4855
 Gly Tyr Thr His Pro Glu Lys Val Leu Lys Pro His Ile Ile Ala Leu
 530 535 540

 ctg gtg gac tcc att gag atc taaaaattta gttaaatttta attttttaaaa 4906
 Leu Val Asp Ser Ile Glu Ile
 545 550

 tgttacgtaa aaaataataa accgtaaaaa taatgaagat taaggcgaac gaaccacgtg 4966
 aggcggaaaac gttgagaatg gatgatggaa aatagatgaa tatattgtta tgcatagaagg 5026
 gtgtttcaca ctcttttgat tttgggaatg catggacatc cgcatagttgt cgactacacc 5086
 tcgaccaatg ttgcgcaagc cacggccgat gcgggcaggc cacggatgac cgttgtgtgtgc 5146
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 <213> Solanum tuberosum

<400> 41
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 Val Ala Asn Phe Ser Pro Ser Leu Trp Gly Asp Arg Phe His Ser Phe
 20 25 30

 Ser Leu Asp Asn Gln Val Ala Glu Lys Tyr Ala Gln Glu Ile Glu Thr
 35 40 45

 Leu Lys Glu Gln Thr Arg Ser Leu Leu Ser Ala Ala Ala Cys Gly Ile
 50 55 60

 Thr Leu Ala Glu Lys Leu Asn Leu Ile Asp Ile Val Glu Arg Leu Gly
 65 70 75 80

Leu	Ala	Tyr	His	Phe	Glu	Lys	Gln	Ile	Asp	Asp	Met	Leu	Asp	Gln	Ile		
				85					90					95			
Tyr	Lys	Ala	Asp	Pro	Asn	Phe	Asp	Ala	His	Asp	Leu	Asn	Thr	Leu	Ser		
			100					105					110				
Leu	Gln	Phe	Arg	Ile	Leu	Arg	Gln	His	Gly	Tyr	Asn	Ile	Ser	Gln	Lys		
		115					120					125					
Phe	Phe	Ser	Arg	Phe	Gln	Asp	Ala	Asn	Gly	Lys	Phe	Lys	Glu	Cys	Leu		
	130					135					140						
Ser	Asn	Asp	Ile	Arg	Gly	Leu	Leu	Asn	Leu	Tyr	Glu	Ala	Ser	His	Val		
145					150					155					160		
Arg	Thr	His	Gly	Glu	Asp	Ile	Leu	Glu	Glu	Ala	Leu	Val	Phe	Ser	Thr		
			165						170						175		
Ala	His	Leu	Glu	Ser	Ala	Ala	Pro	His	Leu	Glu	Ser	Pro	Leu	Ser	Lys		
			180					185					190				
Gln	Val	Thr	His	Ala	Leu	Glu	Gln	Ser	Leu	His	Lys	Ser	Ile	Pro	Arg		
		195					200					205					
Val	Glu	Thr	Arg	Tyr	Phe	Ile	Ser	Ile	Tyr	Glu	Glu	Glu	Glu	Phe	Lys		
	210					215					220						
Asn	Asp	Val	Leu	Leu	Arg	Phe	Ala	Lys	Leu	Asp	Tyr	Asn	Leu	Leu	Gln		
225					230					235					240		
Met	Leu	His	Lys	His	Glu	Leu	Ser	Glu	Val	Ser	Arg	Trp	Trp	Lys	Asp		
			245						250					255			
Leu	Asp	Phe	Val	Thr	Thr	Leu	Pro	Tyr	Ala	Arg	Asp	Arg	Ala	Val	Glu		
			260					265					270				
Cys	Tyr	Phe	Trp	Thr	Met	Gly	Val	Tyr	Ala	Glu	Pro	Gln	Tyr	Ser	Gln		
		275				280						285					
Ala	Arg	Val	Ile	Leu	Ala	Lys	Thr	Ile	Ala	Met	Ile	Ser	Ile	Val	Asp		
	290					295					300						
Asp	Thr	Phe	Asp	Ala	Tyr	Gly	Ile	Val	Lys	Glu	Leu	Glu	Val	Tyr	Thr		
305					310					315					320		
Asp	Ala	Ile	Gln	Arg	Trp	Asp	Ile	Ser	Gln	Ile	Asp	Arg	Leu	Pro	Glu		
			325						330					335			
Tyr	Met	Lys	Val	Ser	Phe	Lys	Ala	Leu	Leu	Asp	Leu	Tyr	Glu	Asp	Tyr		
			340					345					350				
Glu	Lys	Glu	Leu	Ser	Lys	Asp	Gly	Arg	Ser	Asp	Val	Val	His	Tyr	Ala		
		355					360				365						
Lys	Glu	Arg	Met	Lys	Glu	Ile	Val	Arg	Asn	Tyr	Phe	Val	Glu	Ala	Lys		
	370					375					380						

Trp Phe Ile Glu Gly Tyr Met Pro Pro Val Ser Glu Tyr Leu Ser Asn
 385 390 395 400
 Ala Leu Ala Thr Ser Thr Tyr Tyr Leu Leu Thr Thr Thr Ser Tyr Leu
 405 410 415
 Gly Val Lys Ser Ala Thr Lys Glu Asp Phe Glu Trp Leu Ala Thr Asn
 420 425 430
 Pro Lys Ile Leu Glu Ala Asn Val Thr Leu Cys Arg Val Val Asp Asp
 435 440 445
 Ile Ala Thr Tyr Glu Val Glu Lys Gly Arg Gly Gln Ile Ala Thr Gly
 450 455 460
 Ile Glu Cys Tyr Met Arg Asp Tyr Asp Val Ser Thr Glu Val Ala Met
 465 470 475 480
 Glu Lys Phe Gln Glu Met Ala Glu Ile Ala Trp Lys Asp Val Asn Glu
 485 490 495
 Gly Ile Leu Arg Pro Thr Pro Val Ser Thr Glu Ile Leu Thr Arg Ile
 500 505 510
 Leu Asn Leu Ala Arg Ile Ile Asp Val Thr Tyr Lys His Asn Gln Asp
 515 520 525
 Gly Tyr Thr His Pro Glu Lys Val Leu Lys Pro His Ile Ile Ala Leu
 530 535 540
 Leu Val Asp Ser Ile Glu Ile
 545 550

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 <211> 40
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 <213> Solanum tuberosum

<220>
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<210> 43
 <211> 12
 <212> PRT
 <213> Solanum tuberosum

<400> 43
 Met Ala Leu Ala Ile Pro Phe Asn Asn Ala Met Glu
 1 5 10

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 <212> DNA
 <213> Solanum tuberosum

<220>
 <221> CDS
 <222> (5)..(61)

<400> 44
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 1 5 10 15
 cag tcc ctt atg 61
 Gln Ser Leu Met

<210> 45
 <211> 19
 <212> PRT
 <213> Solanum tuberosum

<400> 45
 Met Ala Leu Ala Ile Pro Phe Asn Asn Glu Gly Ser Pro Gly Gly Gln
 1 5 10 15
 Ser Leu Met

<210> 46
 <211> 64
 <212> DNA
 <213> Solanum tuberosum

<220>
 <221> CDS
 <222> (5)..(64)

<400> 46
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 Met Ala Leu Ala Ile Pro Phe Asn Asn Glu Glu Glu Ser Met Gly
 1 5 10 15
 cag tcc ctt atg tta 64
 Gln Ser Leu Met Leu
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<210> 47
 <211> 20
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 <213> Solanum tuberosum

25

<400> 47

Met Ala Leu Ala Ile Pro Phe Asn Asn Glu Glu Glu Ser Met Gly Gln
1 5 10 15

Ser Leu Met Leu
20